

ISTI

FY19 Rapid Response Familiarization Call for Proposals: “Rediscovering Ising: Our New D-Wave 2000Q”

Synopsis: In order to prepare our workforce for emerging and existing novel computing technologies, the Information Science & Technology Institute (ISTI) solicits Rapid Response Familiarization Proposals on the topic of “Rediscovering Ising: Our New D-Wave 2000Q”. Proposals should focus on familiarization with the D-Wave quantum annealer by solving small to mid-size problems from mission-relevant application domains with Ising. In particular, we invite proposals in the following three areas:

1. **For proposers without previous D-Wave experience:** Basic familiarization by formulating domain problems in the QUBO (Quadratic Unconstrained Binary Optimization) format or using Ising as a sampler. Peruse <https://dwave.lanl.gov/> for introductory material to D-Wave.
2. Familiarization studies with the novel control features that came with our recent upgrade from a 1000- qubit D-Wave 2X to a 2000-qubit D-Wave 2000Q system. These features include reverse anneal, anneal pause, and anneal quench. See Mark Johnson’s “Features to control annealing” talk” at <https://dwave.lanl.gov/tem2019/> for a technical description of these features.
3. Simulation-based familiarization studies in preparation for the next-generation D-Wave topology, Pegasus. A Pegasus simulation capability is available through the Ocean Python package from D-Wave.

Budget: Maximum 20k of FY19 G&A funds per proposal (budget covers about 200 hours for mid-career staff).

Rules of engagement: ISTI Rapid Response efforts form a cohort of participants who learn from each other. Participation in cohort events with the community is highly encouraged. Projects funded from this call will:

1. Participate in the Rapid Response Kick-off meeting mid-July
2. Report on their effort to a general lab-wide audience on a Quantum Annealing day at LANL in the

second half of September 2019. Presentations slides will be made available on LANL-internal web

pages.

3. Period of performance is limited to FY19 (i.e., charge codes will be closed last week of September

2019). These G&A funds can be used for familiarization with new technology only and **not** for research.

Proposal format: .25 – 1.0 page, 11pt font as attachment emailed to eldenben@lanl.gov with subject line “ISTI Rapid Response G&A 2019 Rediscovering Ising: proposal title”. Proposals should briefly:

1. (i) Describe the technical approach and identify the mission-relevant application domain,

2. (ii) List performers with a brief description of D-Wave experience (if any) together with an estimate

of labor hours for each performer. Identify other cost items if any.

Evaluation process: A panel of internal experts will select proposals based on strategic portfolio composition and diversity. We encourage proposers without prior D-Wave experience to apply; (unfunded) external collaborators are welcome.

Dates:

Proposal due: Funding decision: Project start: Project end:

June 21, 2019

June 25, 2019

July 1, 2019 September 30, 2019

Subject to availability of funds, late proposals will be accepted for review, however, additional funding decisions will be delayed through July 15 due to various absences. For questions regarding this call, contact Stephan Eidenbenz, eyidenben@lanl.gov.